February 8, 2009

To: Committee on the Environment of the Connecticut General Assembly
From: Sister Noella Marcellino O.S.B., Ph.D.
Re: Opposition to **Bill 6313**

My name is Sister Noëlla Marcellino, O.S.B.. I am a member of the Abbey of Regina Laudis in Bethlehem. I started making cheese at the Abbey dairy in 1976. I have a Ph.D. in microbiology from the University of Connecticut (2003) and I am a Fulbright scholar.

I am opposed to the proposal in Bill 6313 that raw milk producers pay for monthly testing of pathogens. I am in favor of monthly pathogen testing at the State's expense. I take the pathogens *Escherichia coli O157:H7*, *Listeria monocytogenes*, *Salmonella typhimurium*, and *Campylobacter* spp., seriously. The increasing threat to public health by these emerging pathogens has been exacerbated by our medical, agricultural, and food preservation practices (7, 25). Indiscriminate use of antibiotics by humans has created a world-wide crisis of antibiotic resistance in clinical settings (27). The administrating of antibiotics to animals for therapeutic or prophylactic reasons or for growth promotion increases the risk of introducing antibiotic resistant strains into the food chain. (2, 21). Bacteria can develop antibiotic resistance through mutations and more often through horizontal spread of resistant genes from one bacterium to another of the same species or even over species and genus borders, principally by conjugation (1, 14, 20). In natural microenvironments such as milk or meat, antibiotic resistance plasmids can be transferred between bovine, porcine, and human strains of *E. coli* (11). The adaptation of pathogens to the complexity of food environments presents unique problems to the food industry. *Listeria monocytogenes* can grow over a wide range of temperatures from –1.5°C to 50°C, within pH ranges 4.3 to 9.6 and can survive freezing, drying, and salt concentrations of up to 25.5% (5). *L. monocytogenes* as well as other pathogens, when subjected to non-lethal primary stress such as acid or ethanol, can show elevated resistance to that stress after it is removed and reapplied (12). Moreover, once a microorganism has adapted to one non-lethal primary stress, it can then manifest resistance to another stress factor unrelated to the primary stress, a phenomenon called cross-protection (19). Sublethal bacteriostatic stress created by detergents, organic solvents, dyes, food components, and preservatives, while slowing or preventing bacterial growth can induce multiple antibiotic resistance (15). As the microorganisms become more virulent, immunocompromised persons such as pregnant women, transplant recipients, the elderly, and HIV/AIDS patients are especially vulnerable (22). Considering these complexities it is possible to see why both raw milk and pasteurized milk are vulnerable to contamination.

Today you will hear testimony of consumers who despite the risk, want to buy raw milk for its health benefits. Peer reviewed scientific journals offer objective data in this regard. Waser *et al.* reported in the journal *Clinical & Experimental Allergy* that farm milk offered a protection against allergy and asthma (23). Perkin *et al.* using objective measures, such as skin prick tests, serum total IgE levels, and IFN-g production in the stimulated whole blood assay, observed that consumption of unpasteurized milk by children lessoned eczema symptoms and reduced atopy (17). Two authors report that vitamin D supplementation in newborns coincides with an increase in allergy disorders, since the main vitamin D metabolite calcitriol suppresses dendritic cell maturation and

consecutive Th1 cell development, a key mechanism of allergy development. Children drinking raw milk without vitamin D supplementation had less allergies (16, 24).

In this light the ban of raw milk from retail stores will be a hardship for families who depend upon it for the health of their children. If the day should come when the sale of raw milk is not allowed in the State, its sale may go underground. Consider the situation of raw milk sales in Vermont at this time. Milk is only sold on the farm, the farm need not be licensed or inspected, and no testing is done by the State. The State does not know who produces milk, what production conditions exist, or the farm location (Professor Catherine Donnelly, University of Vermont, personal communication). With this arrangement in the event of a food poisoning outbreak, the State is not liable. Yet it is a public health disaster waiting to happen. The raw milk producers of CT want oversight, want to know their product is safe. The State should pay for pathogen testing since food safety must be a mutual concern between the State, producers and consumers.

Raw milk is a complex ecosystem and challenge studies are being carried out to test inhibition of pathogens by natural antimicrobials in raw milk and cheese. The advantage of using antimicrobials instead of pasteurization to inactivate pathogens is to avoid the use of high heat which can alter flavor, color, texture, and nutritional value of food (8) Along with convenience consumers are demanding minimally processed, preservative-free foods. (4). The use of acids, sugar, salt, sulphite and nitrite is no longer desired by those who seek more "natural foods" (10). Bacteriocins, in particular nisin produced by lactic acid bacteria isolated from raw milk, have been used as biopreservatives (13, 26). The lactoperoxidase-thiocyanate-hydrogen peroxide (LP) system, a natural antimicrobial system in raw milk which is activated by hydrogen peroxide-producing lactic acid bacteria present in the milk, has been shown to prevent growth and reduce significantly *L. monocytogenes* numbers during refrigerated storage of raw milk for 5 days (9). Pitt et al. observed a decreased growth rate of *Staphylococcus aureus*, *Salmonella enteritidis*, and *L. monocytogenes* in raw milk held at 99°F/37C for 72 hours in comparison to growth in pasteurized milk; which they concluded was due to the lactoperoxidase system (18). Pasteurization may partially inactivate lactoperoxidase, the natural antimicrobial system in milk (6). Other bactericidal components found in raw milk are: immunoglobulins, lysozyme, lactoferrin and polymorphonuclear leucocytes (3). Although on its web site the International Association of Food Protection states with skepticism that "raw milk advocates suggest that raw milk consumption is safe due to the perceived presence of active natural antimicrobial agents in raw milk…", the above mentioned results invite more research in this area (http://www.foodprotection.org/meetingsEducation/TimelyTopics09.asp).

Respectfully submitted by:

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